

Questions and Answers About Sources of Poverty Data

1. What data sources do you recommend being used at a state and county level for measuring poverty over time - specifically from 2000 forward? Why would you want to use C2SS over the Census 2000? Would the CPS be appropriate?

Following the Office of Management and Budget's Statistical Policy Directive 14, the Census Bureau calculates official poverty estimates for the nation from the CPS. Because of the advantages of the ACS with regard to sample size and design, the Census Bureau recommends using the ACS poverty estimates for states and counties.

State Level

If you are interested in comparing current STATE estimates of poverty with poverty estimates for 2000, the Census Bureau recommends using the Census 2000 Supplementary Survey (C2SS) estimates and the most recent ACS estimates. For additional comparisons of poverty over time at the state level you should use the ACS series of estimates, including both the 2000-2004 supplementary surveys and the 2005-2007 full implementation surveys. Because they are the same survey, factors that may affect comparisons of estimates are minimized. Therefore, it's preferable to use C2SS estimates over Census 2000 estimates for states.

It should be noted that in 2006 the ACS sample was expanded to include the group quarters (GQ) population and poverty rates increased as a result. The effect of this universe change varied by state, depending on the composition of the population. For a preliminary assessment of the effect, the Census Bureau compared state poverty rates for the 2006 ACS with and without the GQ population. Adjustment factors were calculated by taking the percentage point difference between the 2006 poverty rate for the total population and the 2006 poverty rate for the household only population. Subtracting the adjustment factors from the ACS estimates for years 2006 and beyond adjusts these estimates to eliminate the GQ population. These factors can be found in the [attachment](#).

To assess the degree to which these differences would have affected state-level poverty comparisons between 2000 and 2007, the Census Bureau adjusted the C2SS poverty estimates to account for the missing GQ population. Comparisons were made of these adjusted estimates with the 2007 ACS estimates. Based on this assessment, five states that had shown statistically higher poverty in 2007 (total population universe) compared with 2000 (household only population universe) were no longer significantly different when adjustment factors were applied.

For years prior to 2000, the CPS would be the only option and for state-level comparisons we recommend using multiyear averages.

County Level

If you are interested in comparing current COUNTY-LEVEL estimates of poverty with poverty estimates for 2000, the Census Bureau recommends using Census 2000 and the most recent ACS. County-level estimates for 2001 – 2004 are not available for comparisons with current ACS estimates. Beginning with the 2005 ACS, county-level comparisons are possible for measuring poverty over time.

While we generally do not recommend making comparisons across surveys when possible, in this case the lower variance of the Census 2000 estimates represent a clear advantage over the C2SS. A 2004 C2SS/Census 2000 evaluation study (see <http://www.census.gov/acs/www/Downloads/Report05.pdf>) found that, while Census 2000 and C2SS had many methodological and operational differences, a comparison of poverty estimates found that "...data users would likely come to similar conclusions and therefore would be likely to implement support programs and allocate funds in a similar fashion, regardless of whether they used the Census 2000 Sample or the C2SS data." Obviously, any comparison across surveys should only be undertaken after taking the time to understand the differences between these surveys and their potential impact on the data.

For more guidance, please refer to: <http://www.census.gov/acs/www/UseData/compACS.htm>

2. Can you give an example of how to compare that data. For example would you use the absolute terms or would you use the percentages?

The Census Bureau recommends the use of percents when making comparisons because the ACS is designed to produce estimates of distributions or "percent" estimates. Estimates of counts, for example the total number of people in poverty, may also be used. However, the Population Estimates Program produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties. Users should be careful with the interpretation of percent change as these reflect the growth or decline in estimates of counts. Comparisons of ACS estimates are based on statistical tests of significance. For an example, see response to question #4.

3. If you are standing by the use of the C2SS in comparisons of children in poverty from 2000 - 2006, how do I explain to policy makers that a survey from 6 counties is comparable to a survey from the entire state in 2006 - which includes more areas that are in poverty.

The C2SS county sample (see technical note below) was a probability sample and as such was a representative sample for Colorado. That is, the C2SS was designed to produce national and state level estimates. However, estimates from the C2SS sample are subject to larger margins of error than estimates from the current ACS sample. To compare C2SS estimates to estimates from the 2005 ACS and beyond users need to consider the margins of error.

C2SS Sample Design Technical Note - As part of the C2SS sample selection system some counties were selected in sample with certainty. These were primarily large counties such as Los Angeles, San Francisco, and Cooke County. Direct estimation was possible for these counties. Other smaller counties were grouped in sets of 2 or 3 (technically known as PSU's - primary sampling units) prior to sample selection and a probability sample of these areas (or PSU's) was selected. As a result, county level estimates were available for a small subset of counties only. This kind of design supports estimation for states and the nation. Direct estimates for large counties selected in sample with certainty were also possible. A major drawback of the C2SS sample selection system was that the survey estimates were subject to larger variances. This is an important consideration that users need to take into account as explained before.

4. How do you best compare estimates with margins of error over time. An example would be great.

Comparison of estimates should be based on a statistical test of significance. This approach will allow users to assess whether the observed difference is likely due to chance (and thus is not statistically significant) or if it represents a true difference (and thus is statistically significant).

Algebraically, the significance test can be expressed as follows:

If $\left| \frac{\hat{X}_1 - \hat{X}_2}{\sqrt{SE_1^2 + SE_2^2}} \right| > Z_{CL}$, then the difference between estimates \hat{X}_1 and \hat{X}_2 is statistically significant at the specified confidence level, CL

where \hat{X}_i is an annual estimate.

SE_i is the corresponding standard error (SE) for the estimate.

Z_{CL} is the critical value for the desired confidence level (1.645 for 90 percent, 1.960 for 95 percent, and 2.576 for 99 percent).

Most ACS data products show the estimates and their associated margins of error (MOE). So when using ACS data, the SE is calculated by taking the positive value of the MOE and dividing by 1.645 (for years prior to 2006, use 1.65).

Example:

A data user wants to determine if the difference in the observed estimated percent of children under 18 years living in poverty in 2006 (22.0 percent, MOE= ± 0.20) and in 2007 (21.5 percent, MOE= ± 0.20) is statistically different at the 99 percent confidence level.

First, determine the SE for each estimate:

$$SE_1 = \frac{0.20}{1.645} = 0.12 \quad \text{and} \quad SE_2 = \frac{0.20}{1.645} = 0.12$$

Then, calculate the test value using the formula above:

$$\left| \frac{\hat{X}_1 - \hat{X}_2}{\sqrt{SE_1^2 + SE_2^2}} \right| = \left| \frac{22.0 - 21.5}{\sqrt{(0.12)^2 + (0.12)^2}} \right| = \left| \frac{0.5}{\sqrt{0.015 + 0.015}} \right| = \left| \frac{0.5}{\sqrt{0.03}} \right| = \left| \frac{0.5}{0.173} \right| = 2.90$$

Since the test value (2.90) is greater than the critical value for a confidence level of 99 percent (2.576), the difference in the percentages is statistically significant at a 99-percent confidence level. A rough interpretation of the result is the user can be 99 percent certain that a change in the percent of children under 18 years living in poverty took place in 2007.

By contrast, if the corresponding estimates for 2006 and 2007 were 22.1 and 22.5, respectively, with margins of error of ± 0.33 (SE=0.20) and ± 0.41 (SE=0.25), respectively, the formula would yield

$$\left| \frac{\hat{X}_1 - \hat{X}_2}{\sqrt{SE_1^2 + SE_2^2}} \right| = \left| \frac{22.5 - 22.1}{\sqrt{(0.20)^2 + (0.25)^2}} \right| = \left| \frac{0.4}{\sqrt{0.04 + 0.0625}} \right| = \left| \frac{0.4}{\sqrt{0.1025}} \right| = \left| \frac{0.4}{0.320} \right| = 1.25$$

Since the test value (1.25) is less than the critical value for a confidence level of 99 percent (2.576), we can't conclude there was a change.

5. The margins of error are quite large when using the C2SS data to compare to the ACS 2006 at a state level. At what point do you say that the margin of error is too large and it is therefore better to use the Census 2000? How do you balance margin of error with potential survey difference error? If you recommend using the Census 2000 for county data comparisons to the ACS 2006 why wouldn't the survey difference error be even smaller at a state level with a large sample?

Recommendations are based on judgment. There's no magic number. The two main factors that go into a recommendation on what survey to use to look at a time series are consistency in the methods used to produce the estimates and sampling error. To isolate real change (versus a change in measurement) it is always wise to compare estimates based on consistent methods. The CPS methods have been very consistent over time, but standard errors are large. C2SS/ACS comparisons are generally consistent and we think the standard errors, at the state level, are acceptable even in smaller states. Census 2000/ACS comparisons have, as you point out, lower levels of sampling error, but any cross-survey comparison brings risk with it, and at the state level, our judgment was that the cross-survey risk outweighed the benefits of lower standard errors.

That is not to say that other analysts could examine the same numbers we have examined and come up with a different recommendation, or that it is wrong for a user to use CPS or Census 2000/ACS data to examine state trends. We are merely saying that if a reporter calls the Census Bureau and asks whether poverty has changed in Colorado since 2000, our first response will be to use the C2SS and ACS data to answer that basic question.

6. Do you recommend using the C2SS data for race/ethnicity poverty comparisons at the state level?

We haven't done much analysis of this, but in the absence of a detailed analysis, we'd recommend using Census 2000/ACS to look at state poverty trends by race/ethnicity. This would be largely driven by reliability concerns. This is particularly the case for the smaller race groups, such as Native Hawaiians and American Indians and Alaskan Natives.

7. Will you be recommending that users use the C2SS to compare to the ACS through 2010?

Yes, unless further research points to systematic problems associated with C2SS/ACS poverty comparisons that would lead us to change our recommendation.

8. Why hasn't Census produced information on the website that discusses how to compare ACS over time to the C2SS? The majority of your information discusses how to compare 2007 to 2006 to 2005 to Census 2000.

There are many conceptual issues associated with making Census 2000/ACS comparisons. Knowing that users are going to make comparisons between Census 2000 and the ACS, the Census Bureau was obligated to provide users with as much detailed assistance as we could in order to help users interpret trends.

There are fewer conceptual issues to worry about when making C2SS/ACS comparisons, though we have noted that, in the case of poverty, the inclusion of group quarters in the ACS universe makes comparisons more complicated. There is a working paper that will soon be posted on the Census Bureau website that will provide more information to users on the impact of the inclusion of group quarters into the poverty estimates.

9. How important is it to use the margins of error when comparing estimates?

Very important, which is why the Census Bureau always publishes margins of error when disseminating ACS tables, and every statement in a Census Bureau report, press release, or research paper is tested for statistical significance. However, other factors come into play as well, and survey consistency is one of those issues.

10. Do you recommend using SAIPE data for county comparisons overtime - taking into account the break in the time series? In Colorado most of the counties are not part of the annual ACS data. A few more will be part of the three-year average. Do you think SAIPE will be better or worse than a three-year or 5-year moving average?

As you probably know, SAIPE data are the only source of county poverty data for every county in the U.S. that are more up-to-date than Census 2000 data. So for a user who requires up-to-date data for every county, regardless of population size, SAIPE data are a valuable source of information. The data can be used to look at trends, though, as you point out, there is a break in the time series.

At this point we really don't have a basis to compare SAIPE estimates to 3-year or 5-year moving averages, though as you know the 3-year ACS estimates will be released this December. We realize that this will be an important user issue down the road, and the Census Bureau will spend considerable resources researching this issue in order to provide guidance to users.

Attachment

Percentage of People in Poverty in the Past 12 Months by State: 2000 and 2007

State	2000 ACS		2007 ACS		Change in percentage points (2007 ACS less 2000)	
	Percentage	90-percent confidence interval/1 (+/-)	Percentage	90-percent confidence interval/1 (+/-)	Percentage	90-percent confidence interval/1 (+/-)
United States.....	12.2	0.2	13.0	0.1	* 0.8	0.2
Alabama.....	15.6	1.0	16.9	0.5	* 1.3	1.1
Alaska.....	9.1	0.8	8.9	0.8	-0.2	1.1
Arizona.....	15.6	1.0	14.2	0.5	* -1.4	1.1
Arkansas.....	17.0	1.2	17.9	0.6	0.9	1.3
California.....	13.7	0.5	12.4	0.2	* -1.3	0.5
Colorado.....	8.7	0.8	12.0	0.4	* 3.3	0.9
Connecticut.....	7.7	0.8	7.9	0.4	0.2	0.9
Delaware.....	9.3	1.0	10.5	0.9	1.2	1.3
District of Columbia.	17.5	1.5	16.4	1.4	-1.1	2.1
Florida.....	12.8	0.5	12.1	0.2	* -0.7	0.5
Georgia.....	12.6	0.8	14.3	0.3	* 1.7	0.9
Hawaii.....	8.8	0.8	8.0	0.5	-0.8	0.9
Idaho.....	11.4	1.3	12.1	0.6	0.7	1.4
Illinois.....	11.1	0.7	11.9	0.3	* 0.8	0.8
Indiana.....	10.1	1.0	12.3	0.3	* 2.2	1.0
Iowa.....	10.0	0.7	11.0	0.5	* 1.0	0.9
Kansas.....	9.5	0.8	11.2	0.5	* 1.7	0.9
Kentucky.....	16.4	1.2	17.3	0.5	0.9	1.3
Louisiana.....	20.0	1.0	18.6	0.5	* -1.4	1.1
Maine.....	10.1	1.2	12.0	0.6	* 1.9	1.3
Maryland.....	9.3	0.8	8.3	0.4	* -1.0	0.9
Massachusetts.....	9.6	0.7	9.9	0.3	0.3	0.8
Michigan.....	10.1	0.5	14.0	0.3	* 3.9	0.6
Minnesota.....	6.9	0.7	9.5	0.3	* 2.6	0.8
Mississippi.....	18.2	1.0	20.6	0.7	* 2.4	1.2
Missouri.....	11.2	0.7	13.0	0.4	* 1.8	0.8
Montana.....	13.4	1.3	14.1	0.8	0.7	1.5
Nebraska.....	9.6	0.7	11.2	0.5	* 1.6	0.9
Nevada.....	9.9	1.2	10.7	0.7	0.8	1.4
New Hampshire.....	5.3	0.8	7.1	0.6	* 1.8	1.0
New Jersey.....	7.9	0.5	8.6	0.3	* 0.7	0.6
New Mexico.....	18.0	1.7	18.1	0.8	0.1	1.9
New York.....	13.1	0.5	13.7	0.2	* 0.6	0.5

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State	2000 ACS		2007 ACS		Change in percentage points (2007 ACS less 2000)	
	Percentage	90-percent confidence interval/1 (+/-)	Percentage	90-percent confidence interval/1 (+/-)	Percentage	90-percent confidence interval/1 (+/-)
North Carolina.....	13.1	0.7	14.3	0.3	* 1.2	0.8
North Dakota.....	11.6	1.7	12.1	0.9	0.5	1.9
Ohio.....	11.1	0.8	13.1	0.3	* 2.0	0.9
Oklahoma.....	13.8	0.8	15.9	0.5	* 2.1	0.9
Oregon.....	13.2	1.5	12.9	0.5	-0.3	1.6
Pennsylvania.....	10.5	0.7	11.6	0.3	* 1.1	0.8
Rhode Island.....	10.7	1.2	12.0	0.9	1.3	1.5
South Carolina.....	14.4	0.8	15.0	0.5	0.6	0.9
South Dakota.....	11.5	0.8	13.1	0.8	* 1.6	1.1
Tennessee.....	13.5	0.8	15.9	0.5	* 2.4	0.9
Texas.....	15.1	0.5	16.3	0.2	* 1.2	0.5
Utah.....	8.8	1.2	9.7	0.5	0.9	1.3
Vermont.....	10.7	1.2	10.1	0.9	-0.6	1.5
Virginia.....	9.2	0.8	9.9	0.3	0.7	0.9
Washington.....	11.6	1.2	11.4	0.3	-0.2	1.2
West Virginia.....	18.6	1.3	16.9	0.6	* -1.7	1.4
Wisconsin.....	8.9	1.2	10.8	0.3	* 1.9	1.2
Wyoming.....	11.4	1.7	8.7	1.2	* -2.7	2.1

*Significantly different from zero at the 90-percent confidence level.

1/A 90-percent confidence interval is a measure of an estimate's variability. The larger the confidence interval in relation to the size of the estimate, the less reliable the estimate. For more information see "Standard errors and their use" at http://www.census.gov/hhes/www/p60_235sa.pdf.

Source: U.S. Census Bureau, 2000 and 2007 American Community Surveys

Poverty Rates by State and Universe: 2006

States	Total Population Poverty Universe	Household Population Poverty Universe	Difference (Poverty rate for TP minus HU)
United States	13.3	13.1	0.2
Alabama	16.6	16.4	0.2
Alaska	10.9	10.8	0.1
Arizona	14.2	13.9	0.2
Arkansas	17.3	17.1	0.2
California	13.1	12.9	0.2
Colorado	12.0	11.7	0.2
Connecticut	8.3	8.1	0.2
Delaware	11.1	10.9	0.2
District of Columbia	19.6	19.0	0.6
Florida	12.6	12.4	0.2
Georgia	14.7	14.5	0.2
Hawaii	9.3	9.1	0.2
Idaho	12.6	12.3	0.2
Illinois	12.3	12.1	0.2
Indiana	12.7	12.5	0.2
Iowa	11.0	10.7	0.2
Kansas	12.4	12.2	0.2
Kentucky	17.0	16.8	0.2
Louisiana	19.0	18.9	0.2
Maine	12.9	12.6	0.3
Maryland	7.8	7.6	0.2
Massachusetts	9.9	9.7	0.3
Michigan	13.5	13.2	0.3
Minnesota	9.8	9.5	0.3
Mississippi	21.1	20.9	0.2
Missouri	13.6	13.4	0.2
Montana	13.6	13.3	0.3
Nebraska	11.5	11.3	0.2
Nevada	10.3	10.2	0.1
New Hampshire	8.0	7.9	0.2
New Jersey	8.7	8.4	0.3
New Mexico	18.5	18.3	0.2
New York	14.2	13.8	0.4
North Carolina	14.7	14.4	0.2
North Dakota	11.4	11.4	0.1
Ohio	13.3	13.2	0.2
Oklahoma	17.0	16.8	0.2
Oregon	13.3	13.0	0.3
Pennsylvania	12.1	11.8	0.3
Rhode Island	11.1	10.9	0.2
South Carolina	15.7	15.5	0.2
South Dakota	13.6	13.3	0.3
Tennessee	16.2	16.0	0.2

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States	Total Population Poverty Universe	Household Population Poverty Universe	Difference (Poverty rate for TP minus HU)
Texas	16.9	16.8	0.1
Utah	10.6	10.4	0.2
Vermont	10.3	10.1	0.2
Virginia	9.6	9.4	0.1
Washington	11.8	11.5	0.3
West Virginia	17.3	17.2	0.1
Wisconsin	11.0	10.7	0.3
Wyoming	9.4	9.2	0.1

Source: U.S. Census Bureau, 2006 American Community Survey